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JCS26 U.S. PTO

**UTILITY
PATENT APPLICATION
TRANSMITTAL**

(Only for new nonprovisional applications under 37 C.F.R. § 1.53(b))

Attorney Docket No. _____

First Inventor or Application Identifier Pasi LoukasTitle Variable Wavelength Impulse Transmission

Express Mail Label No. _____

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

ADDRESS TO:Assistant Commissioner for Patents
Box Patent Application
Washington, DC 20231

1. ☒ Fee Transmittal Form (e.g., PTO/SB/17)
(Submit an original and a duplicate for fee processing)
2. ☒ Specification [Total Pages 7]
(preferred arrangement set forth below)
- Descriptive title of the invention
- Cross References to Related Applications
- Statement Regarding Fed sponsored R & D
- Reference to Microfiche Appendix
- Background of the invention
- Brief Summary of the invention
- Brief Description of the Drawings (if filed)
- Detailed Description
- Claim(s)
- Abstract of the Disclosure
3. ☒ Drawing(s) (35 U.S.C. 113) [Total Sheets 2]
4. Oath or Declaration [Total Pages 2]
a. ☒ Newly executed (original or copy)
b. ☐ Copy from a prior application (37 C.F.R. § 1.63(d))
(for continuation/divisional with Box 16 completed)
i. ☐ DELETION OF INVENTOR(S)
Signed statement attached deleting inventor(s) named in the prior application, see 37 C.F.R. §§ 1.63(d)(2) and 1.33(b).

5. ☐ Microfiche Computer Program (Appendix)
6. Nucleotide and/or Amino Acid Sequence Submission
(if applicable, all necessary)
a. ☐ Computer Readable Copy
b. ☐ Paper Copy (identical to computer copy)
c. ☐ Statement verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

7. ☐ Assignment Papers (cover sheet & document(s))
8. ☐ 37 C.F.R. §3.73(b) Statement of Attorney
(when there is an assignee) ☐ Power of Attorney
9. ☐ English Translation Document (if applicable)
10. ☐ Information Disclosure Statement (IDS)/PTO-1449 ☐ Copies of IDS Citations
11. ☐ Preliminary Amendment
12. ☐ Return Receipt Postcard (MPEP 503)
(Should be specifically itemized)
13. ☒ Small Entity Statement(s) ☒ Statement filed in prior application, Status still proper and desired (PTO/SB/09-12)
14. ☐ Certified Copy of Priority Document(s)
(if foreign priority is claimed)
15. ☒ Other: REPORT OF CORRECTIONS MADE TO PROVISIONAL APPLICATION

* NOTE FOR ITEMS 1 & 13: IN ORDER TO BE ENTITLED TO PAY SMALL ENTITY FEES, A SMALL ENTITY STATEMENT IS REQUIRED (37 C.F.R. § 1.27), EXCEPT IF ONE FILED IN A PRIOR APPLICATION IS RELIED UPON (37 C.F.R. § 1.28).

16. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in a preliminary amendment:☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No. _____

Prior application information: Examiner _____

Group / Art Unit: _____

For CONTINUATION or DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 4b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

17. CORRESPONDENCE ADDRESS☐ Customer Number or Bar Code Labelor ☒ Correspondence address below

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Name (Print/Type)

Pasi Loukas

Registration No. (Attorney/Agent)

Signature

Pasi Loukas

Date

5/30/2000

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STATEMENT CLAIMING SMALL ENTITY STATUS (37 CFR 1.9(f) & 1.27(b))--INDEPENDENT INVENTOR	Docket Number (Optional)
--	--------------------------

Applicant, Patentee, or Identifier: Pasi Loukas

Application or Patent No.: _____

Filed or issued: _____

Title: Variable Wavelength Impulse Transmission

As a below named inventor, I hereby state that I qualify as an independent inventor as defined in 37 CFR 1.9(c) for purposes of paying reduced fees to the Patent and Trademark Office described in:

- ☒ the specification filed herewith with title as listed above.
- ☒ the application identified above.
- ☐ the patent identified above.

I have not assigned, granted, conveyed, or licensed, and am under no obligation under contract or law to assign, grant, convey, or license, any rights in the invention to any person who would not qualify as an independent inventor under 37 CFR 1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

Each person, concern, or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:

- ☒ No such person, concern, or organization exists.
- ☐ Each such person, concern, or organization is listed below.

Separate statements are required from each named person, concern, or organization having rights to the invention stating their status as small entities. (37 CFR 1.27)

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

<u>Pasi Loukas</u> NAME OF INVENTOR	_____ NAME OF INVENTOR	_____ NAME OF INVENTOR
<u>Pasi Loukas</u> Signature of inventor	_____ Signature of inventor	_____ Signature of inventor
<u>5/30/2000</u> Date	_____ Date	_____ Date

Inventor: Pasi Loukas, Finland

Variable Wavelength Impulse Transmission

Claims the benefit of provisional patent application number 60 / 171,137.

RELATED APPLICATIONS

Not Applicable

BACKGROUND OF THE INVENTION

The invention was conceived for the need to find a competitive transmission solution especially for wireless communications as an alternative for the industry monopolization.

DESCRIPTION OF THE PRIOR ART

Prior art covers impulse transmission without carrier wave, applying either radio or electrical impulses. Further, pulse width and pulse position modulation have wide use in signal processing.

SUMMARY OF THE INVENTION

A method for transmitting data without carrier wave, applying short variable wavelength one-cycle radio or electric impulses, plus method for receiving such impulses, plus method for organizing wireless traffic that uses said transmission system.

DESCRIPTION OF THE DRAWINGS

FIG. 1 depicts Variable Wavelength Impulse Transmission impulse cue. Impulses $i_1..i_4$ have each a unique wavelength. Impulses have their own positions inside interval t depicted by distances $td_1..td_4$ of the centers of impulses from the center of each impulse's host interval.

SPECIFICATION

Variable Wavelength Impulse Transmission method

In time axis, time is divided to equal length intervals t , each of them carrying single radio or electrical impulse, the center of the impulse being at distance t_d from the center of the interval t (refer figure 1). The impulses have alternatively A) a predetermined number of clearly separable wavelengths, or B) infinite number of wavelengths between predetermined minimum and maximum wavelengths. Data is encoded into transmission by choosing appropriate impulse wavelength according to the value of sequence of bits of data to be sent. In case A if there are number n separate impulse wavelengths, then one impulse is able to carry number of bits of data equal to 2-based logarithm of n . In case B the transmission principle is the same as in case A, except that there is no absolute limit how many bits of data one impulse can carry, it is limited only by the transmission device's ability to distinguish closely adjacent wavelength impulses.

The cue of impulses in transmission is divided into transmission channels either by taking every n th impulse for a single channel, or by setting a predetermined order path according to which the impulses are picked for each channel.

Impulse distinguishing method in impulse receiving process

Impulses are distinguished in impulse receiving process either A) by determining the wavelength of each transmission impulse from the time difference between its positive and negative amplitude maximums, or B) by setting an own reception channel for each wavelength of impulse. In case A the transmission impulse's distance t_d from the transmission interval's center is zero. In case B the transmission impulse's distance t_d from the transmission interval's center is different for each impulse, either negative (the center of impulse is before the interval's center) or positive (the center of impulse is after the interval's center).

In case B each reception channel generates reception impulses that are of same wavelength, as with the impulses it is purported to receive (refer figure 2A). The reception impulses are repeated in the same intervals as the interval of the said transmission system, the center of the reception

impulse being at same distance t_d from the center of interval t as with the transmission impulse it is meant to detect. The reception of an transmission impulse is detected as an co-amplitude effect or peak impulse which the transmission impulse and reception impulse form when they meet each other. The transmission impulse's actual wavelength is recognized by comparing the peak impulses of different reception channels and finding the peak impulse which has the greatest amplitude (refer figure 2B for a case where the transmission and reception signals are of same wavelength; and figure 2C for a case where the transmission and reception signals are of different wavelength).

Method for organizing wireless transmission traffic which uses Variable Wavelength Impulse Transmission

When using the said transmission system in wireless radio transmission data or voice communications, a single transmission channel is divided into several sub-channels by allocating different impulse wavelengths for different use if so needed. Impulse wavelengths are chosen for allocation according to the needed transmission power and the ability to pass obstacles of different wavelength impulses. The allocation is altered dynamically to optimize best overall transmission traffic every moment, when needed.

CLAIMS

1.

Variable Wavelength Impulse Transmission method wherein data is sent without carrier wave, by using short variable wavelength radio impulses that are of one-cycle form. The space of the used wavelengths of the impulses consists of either A) a predetermined number of clearly separable wavelengths, or B) infinite number of wavelengths between predetermined minimum and maximum wavelengths. Data is encoded into the transmission by choosing an appropriate impulse wavelength according to the value of sequence of bits of data to be sent. In the transmission the time is divided in time axis to equal length intervals t , each of them carrying single impulse, the center of the impulse being at distance t_d from the center of the interval t . The distance t_d is either negative (the center of impulse is before the interval's center, within the interval), or positive (the center of impulse is on or after the interval's center, within the interval). The cue of impulses in transmission is divided into transmission channels either A) by taking every n th impulse for a single channel, or B) by setting a predetermined order path according to which the impulses are picked for each channel.

In impulse receiving process of said transmission system, impulses are distinguished either A) by determining the wavelength of each transmission impulse from the time difference between its positive and negative amplitude maximums, or B) by setting an own reception channel for each wavelength of impulse. In case A the transmission impulse's distance t_d from the transmission interval's t center is zero. In case B the transmission impulse's distance t_d from the transmission interval's t center is different for each impulse, either negative (the center of impulse is before the interval's center), or positive (the center of impulse is on or after the interval's center). In case B each reception channel generates reception impulses that are of same wavelength, as with the impulses it is purported to receive. The reception impulses are repeated in the same intervals as the interval t of the said transmission system, the center of the reception impulse being at same distance t_d from the center of interval t as with the transmission impulse it is meant to detect. The reception of an transmission impulse is detected as an co-amplitude effect or peak impulse which the transmission impulse and reception impulse form when they meet each other. The transmission impulse's actual wavelength is recognized by comparing the peak impulses of different reception channels and finding the channel which has the greatest amplitude peak impulse. The channel

having it has the same wavelength of reception impulse as is the wavelength of the transmission impulse.

2.

Such transmission system as described in claim 1, having all parts of it, including the impulse distinguishing method in impulse receiving process, with the exception that instead of radio impulses, the used impulses are electric impulses in such transmission system.

3.

Method for organizing wireless transmission traffic in wireless radio transmission data or voice communications, such communications using transmission system described in claim 1, wherein a single transmission channel is divided into several sub-channels by allocating different impulse wavelengths for different use if so needed. Impulse wavelengths are chosen for specific use according to the needed transmission power and the ability to pass obstacles of different wavelength impulses. The allocation is altered dynamically in real time to optimize best overall transmission traffic every moment, when needed.

ABSTRACT

A method for transmitting data without carrier wave, applying short variable wavelength radio or electric impulses. Data is encoded to impulses using pulse width modulation applied for one-cycle impulses. Depending of the impulse receiving process the transmission system uses a kind of hybrid pulse width - pulse position modulation applied for one-cycle impulses in actual impulse transmission. The impulse cue in transmission is divided to channels by picking every n th impulse for a single channel, or by setting a predetermined order path for each channel which is used to pick impulses. Impulse receiving process distinguishes impulses either by determining an impulse wavelength from the time difference between positive and negative amplitude maximums of an impulse, or by setting an own reception channel for each wavelength of impulse. In the latter type of receiving, it is used the kind of hybrid pulse width - pulse position modulation applied for one-cycle impulses in impulse transmission.

In addition, a method for organizing wireless traffic that uses presented transmission system. A single transmission channel is divided into several sub-channels by allocating different impulse wavelengths for different use. Impulse wavelengths are chosen for specific use according to the needed transmission power and the ability to pass obstacles of different wavelength impulses. The allocation is altered dynamically over time to optimize best overall transmission traffic every moment.

REPORT OF CORRECTIONS MADE TO PROVISIONAL PATENT APPLICATION WHICH
BENEFITS CLAIMED IN THIS APPLICATION

I request your permission for the following corrections that I have made to provisional patent application which benefits are claimed in this application:

-I am Finnish citizen and because of language difficulties I have used erroneously the word "bandwidth" where I meant "wavelength". From the context can be seen in each case that I have done it consistently every time and meant "wavelength". So I have replaced in the text the word "bandwidth" every time it is mentioned with the word "wavelength".

-In the first paragraph of the specification was a sentence containing technical error. It was in original form as follows (the word bandwidth replaced with wavelength):

"In case A if there are number n separate impulse wavelengths, then one impulse is able to carry number n bits of data."

I have corrected it. The sentence is not relevant for the subject matter, it is only for to help reader get better idea of it. If you cannot accept it, it can be stricken through. The sentence is in new form as follows:

"In case A if there are number n separate impulse wavelengths, then one impulse is able to carry number of bits of data equal to 2-based logarithm of n ."

If the correction cannot be accepted, it is needful also to strike through the next sentence after that (due to the context), which is below:

"In case B the transmission principle is the same as in case A, except that there are no absolute limit how many bits of data one impulse can carry, it is limited only by the transmission device's ability to distinguish closely adjacent wavelength impulses."

-In drawings I have moved the headers and the description footnotes to the description section of figures. Also I have corrected the erroneous unit marking "V or dB" as "V" in the vertical axis in figures 1 and 2A, 2B, 2C.

-In addition to the above mentioned corrections, I have corrected some misspellings and made the layout better conform to the formal requirements.

With respect



Pasi Loukas, Finland

FIG. 1

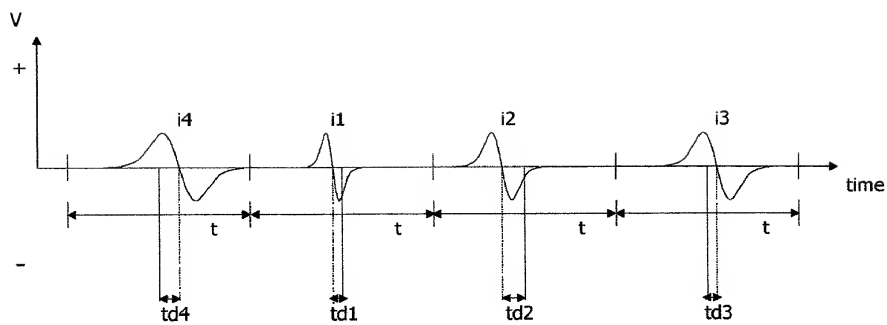


FIG. 2

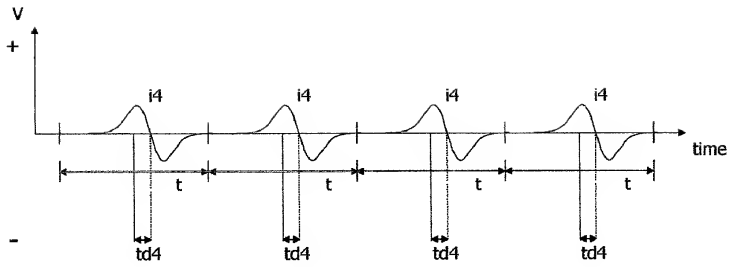


FIG. 2A

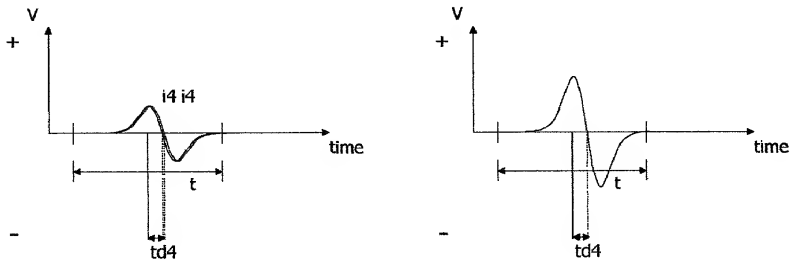


FIG. 2B

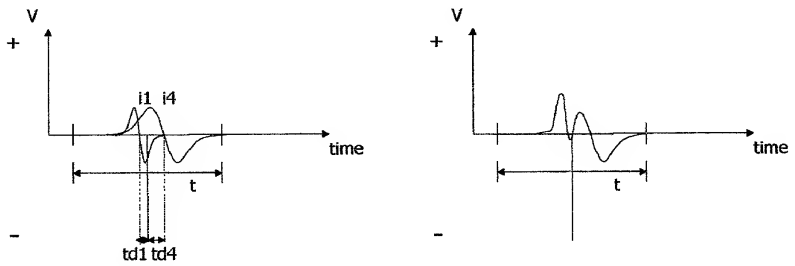



FIG. 2C

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DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)	Attorney Docket Number	
	First Named Inventor	Pasi Loukas
	COMPLETE IF KNOWN	
	Application Number	/
	Filing Date	
<input checked="" type="checkbox"/> Declaration Submitted with Initial Filing	OR	<input type="checkbox"/> Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16 (e)) required)
	Group Art Unit	
	Examiner Name	

As a below named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Variable Wavelength Impulse Transmission

the specification of which (Title of the Invention)

☒ is attached hereto

OR

☐ was filed on (MM/DD/YYYY) as United States Application Number or PCT International

Application Number and was amended on (MM/DD/YYYY) (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT International application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or of any PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached?	
				YES	NO
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto:

I hereby claim the benefit under 35 U.S.C. 119(a) of any United States provisional application(s) listed below.

Application Number(s)	Filing Date (MM/DD/YYYY)	<input type="checkbox"/> Additional provisional application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.
60/171,137	12/20/1999	

[Page 1 of 2]

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DECLARATION — Utility or Design Patent Application

I hereby claim the benefit under 35 U.S.C. 120 of any United States application(s), or 365(c) of any PCT international application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT international application in the manner provided by the first paragraph of 35 U.S.C. 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

U.S. Parent Application or PCT Parent Number	Parent Filing Date (MM/DD/YYYY)	Parent Patent Number (if applicable)

☐ Additional U.S. or PCT international application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

As a named inventor, I hereby appoint the following registered practitioner(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

☐ Customer Number OR ☐ Registered practitioner(s) name/registration number listed below

Place Customer Number Bar Code Label here

Name	Registration Number	Name	Registration Number

☐ Additional registered practitioner(s) named on supplemental Registered Practitioner Information sheet PTO/SB/02C attached hereto.

Direct all correspondence to: ☐ Customer Number or Bar Code Label OR ☒ Correspondence address below

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Country	FINLAND	Telephone	+358-16-3799136	Fax	+358-16-3799579

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Name of Sole or First Inventor: ☐ A petition has been filed for this unsigned inventor

Given Name (first and middle (if any))		Family Name or Surname	
Pasi Into		Loukas	
Inventor's Signature	Pasi Loukas		Date
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Post Office Address			
City	Rovaniemi	State	—
	ZIP	96700	Country
	FINLAND		

☐ Additional inventors are being named on the supplemental Additional Inventor(s) sheet(s) PTO/SB/02A attached hereto